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ABSTRACT

Mathematics and science classes integrated computer science activities into the regular secondary curriculum. This document reports the nature of the computer activities used in conjunction with an algebra II class, a physics class and a chemistry class. A computer programing class was also established as a year-long elective course. Success and problems encountered in this project are discussed and a subjective evaluation of the programs is given. This work was prepared under an ESEA Title III contract. (JP)

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IMPROVED MATHEMATICS CURRICULUM THROUGH COMPUTER TIME-SHARING

END OF PROJECT REPORT
FOR
TITLE III, ESEA

Submitted to:
South Carolina State Department
of Education

By
Horry County Department of Education
Box 680
Conway, South Carolina 29526

June 30, 1973

SE 017 112

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PART III - BUDGET

SOUTH CAROLINA DEPARTMENT OF EDUCATION

PART I
STATISTICAL REPORT
Elementary and Secondary Education Act, Title III, P. L. 89-10, As Amended

SECTION A - GENERAL PROJECT INFORMATION — GRANT NUMBER _____ (State Use Only)

1. NAME AND ADDRESS OF LOCAL SCHOOL DISTRICT

Horry County Schools
Department of Education
Conway, South Carolina 29526

2. REASON FOR SUBMISSION OF THIS FORM (Check One)

a. ( ) INITIAL APPLICATION FOR TITLE III GRANT

b. ( ) APPLICATION FOR CONTINUATION GRANT
PROJECT NUMBER _____

c. (x) END OF PROJECT REPORT
PROJECT NUMBER _____

3. PROJECT TITLE (5 WORDS OR LESS)

4. CRITICAL NEEDS DESCRIPTOR

(a) ELEMENTARY
- ( ) READING
- ( ) LANGUAGE ARTS
- ( ) MATHEMATICS
- ( ) ART
- ( ) MUSIC

(b) SECONDARY
- ( ) READING
- ( ) SOCIAL STUDIES
- ( ) SCIENCE
- ( ) LANGUAGE ARTS
- (x) MATHEMATICS
- ( ) ART
- ( ) MUSIC

(c) OTHER
- ( ) PRE-VOCATIONAL
- ( ) VOCATIONAL
- ( ) DROPOUT PREVENTION

5. TITLE III FUNDS REQUESTED

	BEGINNING DATE (Month, Year)	ENDING DATE (Month, Year)	FUNDS REQUESTED
a. Initial Application	June 1, 1970	June 30, 1971	$11,400.00
b. Application for First Continuation Grant	July 1, 1971	June 30, 1972	13,867.00
c. Application for Second Continuation Grant	July 1, 1972	June 30, 1973	13,867.00
d. Total Title III Funds			$39,134.00

6. NAME AND ADDRESS OF PERSON AUTHORIZED TO RECEIVE GRANT

Mr. T. W. Anderson
Horry County Dept. of Education
P. O. Box 680, Conway, South Carolina 29526
TITLE: Superintendent of Education
PHONE: 248-2206

7. LIST SCHOOL DISTRICTS TO BE SERVED BY PROJECT

Horry County Schools

TOTAL DISTRICTS SERVED: 1

8. NAME OF PROJECT DIRECTOR

Mrs. Nancy Boyd

PHONE: 448-7140

9. ADDRESS (Number, Street, City, Zip Code)

Myrtle Beach High School
P. O. Box 2037
Myrtle Beach, South Carolina 29577

I hereby certify that the information contained in this application is, to the best of my knowledge correct and the local educational agency named above has authorized me as its representative to file this application.

10. SIGNATURE OF PERSON AUTHORIZED TO RECEIVE GRANT

T. W. Anderson

11. DATE

June 30, 1973

SDE-45-0011 TD 1/29/71

(Revised August, 1970)

NAME OF SCHOOL DISTRICT: Horry County Schools

SECTIONS B AND C MUST BE COMPLETED FOR EACH DISTRICT THAT IS TO BE SERVED BY THE PROJECT. A COMPOSITE PAGE MUST BE INCLUDED FOR MULTI-DISTRICT PROJECTS (SECTION C ONLY).

SECTION B - FISCAL INFORMATION

1. PER PUPIL (ADA) EXPENDITURE OF NON-FEDERAL FUNDS
   a. FISCAL YEAR ENDING JUNE 30, 1970 _____
   b. FISCAL YEAR ENDING JUNE 30, 1971 _____
   c. ESTIMATED EXPENDITURES FISCAL YEAR ENDING JUNE 30, 1972 _____

2. ASSESSED VALUATION AND TAX LEVY
   a. TOTAL ASSESSED VALUATION _____
   b. ASSESSED VALUATION PER PUPIL _____
   c. ASSESSED VALUE AS PERCENT OF TRUE VALUE _____
   d. NUMBER OF MILLS LEVIED FOR OPERATIONS _____
   e. NUMBER OF MILLS LEVIED FOR DEBT SERVICE _____

SECTION C - TOTAL SCHOOL ENROLLMENT AND PROJECT PARTICPANTS (FOR CONTINUATION REQUESTS, THIS DATA SHOULD REFLECT STATUS DURING THE GRANT PERIOD CURRENTLY IN EFFECT).

		PRE-KINDERGARTEN	KINDERGARTEN	GRADES 1-6	GRADES 7-12	OTHER (SPECIFY)	TOTALS
1. School Enrollment in District	Public		215	9691	8790		18696
	Non-Public			230	65		295
2. Persons Participating in Project	Public				200		200
	Non-Public						
	Not Enrolled						
3. Staff In-Service Training	Public				4		4
	Non-Public				0		0
4. Participation by Ethnic Group	White				175		175
	Non-White				25		25

PART II - NARRATIVE

I. PROCEDURES AND PROGRAM CONTENT

A. Current activities and procedures

(1) The computer was used in conjunction with an Algebra II class. The class used a special text A Second Course in Algebra and Trigonometry produced by the Colorado Schools Computing Science Curriculum Development Project. The course gave an integrated presentation of second year Algebra and beginning computer programming. The computer was used to support and reinforce the presentation of the mathematics and stimulate student interest. Computer techniques were introduced using flowcharts, developing algorithms and student modeling of mathematics concepts. The BASIC language was used to develop programs. Library programs were also used by the class members for review and additional work.

The class was conducted according to regular classroom procedures. Group work and independent study procedures were used. A variety of presentation methods were used to introduce new concepts - some traditional; others using computer oriented techniques. Certain amounts of time were set aside for computer lab work to provide those students who had difficulty returning to complete their assignments time to use the teletypes and the computer.

(2) Provisions were made for a year long computer class but because of scheduling difficulties the class did not materialize. One student who expressed desire to take the course was placed on independent study. He was assigned to a regular class period but reported to the room where the computer facilities were housed. A variety of materials were used since there was very little available time for teacher explanation. The Algebra II materials were used, manuals and supplementary and teacher made materials were used. A book BASIC BASIC by Cohen was finally used as a basic text from which assignments were given. The student at first required much explanation and had to return during another period when the teacher was free. After this student had grasped the fundamentals he was able to proceed with minimum explanation. This arrangement seemed to work very well. It was apparent to the teacher, though, that this particular student would have possibly gained more in a regular classroom situation. Basic understanding of the language and use of the computer was gained but the student was not able to cover all of the material. This was partly due to lack of initiative and partly because the student did not have readily available explanation as would have been the case if he had been in a regular classroom situation.

(3) Because of student demand, a computer Math Class was organized second semester. Students who enrolled came from all levels

(ninth grade - twelfth). Their backgrounds were varied. There were three enrolled in geometry, two in Algebra I and the others were either enrolled in General Math or had taken only general math courses. Activities were arranged so as to give review work in general math, introduce some new ideas as some topics from number theory, or interesting facts about sequences and series. Flowcharting was used to introduce concepts and lead to the introduction of programming. Library programs were used frequently. Several students were unable to really grasp the programming and one could not, even at the end of the semester, write a simple program by himself. Group work was used throughout the semester with an attempt to pair the weaker students with stronger ones. This appeared to work fairly well except for minor personality conflicts. Students were frequently regrouped for several reasons. To avoid personality conflict, to avoid too much fraternization and provide challenge for both the weaker and stronger students. Topics and level of material had to be adjusted to meet the individual needs of each student. Class assignments were kept at a minimum and on a simple level. For students who had much ability extra work was provided. It was found that a couple of students would immediately go into the more challenging work and overlook the class assignments.

Evaluation of these students was difficult. In fact the class was much of a challenge to the teacher from several standpoints.

There arose discipline problems both in the computer room and in the classroom which were different from those ordinarily encountered. Adjusting the level of material, organizing activities, finding available topics which the students could do with limited math backgrounds turned out to be quite a task. The class was interesting, rewarding and stimulating. Several students gained much by just being able to run programs and participate in the review activities. The use of the computer should definitely not be limited to the better student or to those with extensive math backgrounds.

(4) The Physics Class as well as the two Chemistry Classes utilized the computer particularly in lab situations. Programs used were student written. There were also available several library programs that could be used in both of these areas. The programs were used quite extensively for a period, but the teacher lost interest and some problem arose in time conflict. These classes were unfortunately scheduled during the periods when the Algebra II and Computer Math classes were in sessions. Many students would not return at other times even though there was little or no original work done or encouraged by the science teacher. Only a few students who had participated in last year's program or were enrolled in the Algebra II or Computer Class did any additional work. This work was used as supplementary work and the student given credit.

There was no other participation in the science department although both students and teachers were encouraged. Offers to write programs, introduce use of teletypes and computer and to supervise were made but there was no response. There seems to be a hesitation on the part of the teachers to become involved. This in turn prevents student involvement unless they are involved in other classes.

(5) Library programs were used in the Algebra III and Algebra I classes. Class assignments were given in Algebra III in two areas. Completing the square and forming quadratic functions. There were three library programs for each of these. One program gave examples for the student to work, the second program checked the student's answers and the third provided a test for the student. Explanation had to be given to get on line and call the program. Use of these was successful. Several problems were encountered. Placing deadlines on these had to be adjusted since the computer happened to be down on several occasions and because each test program took about 15-20 minutes per student. As is the usual case several students procrastinated and this caused some difficulty. Several teacher-written programs were used to check homework in some supplementary areas covered by the class. Not all students utilized these but all except perhaps two members of the class turned in work and computer print out sheets for the other areas.

Class members were offered explanation on writing programs on individual basis and encouraged to write his own programs. Two members took advantage of this. One girl, with the help of a member in Algebra II, became a fairly good programmer and produced some very good programs. She worked on several programs with the Algebra II student and also tackled a few topics from the Algebra III.

The Algebra I students were also given brief introduction to the machines and programming. Four students began to do simple programs using manuals and supplementary materials. One boy became a fair programmer and asked for ideas for programs. These students used their breaks, lunch period, before and after school or study periods to return to work.

For extra work, library programs were assigned on factoring and working with polynomials. Only five members ran these and turned in work and computer print out sheets. This was not a regular assignment and had been left as optional for the student.

(6) The Sociology class used the computer to organize data and compile results from a poll that they had taken. A student enrolled in the Algebra II class wrote the program and gave instructions to the class members. The class came in groups of two and three, made tapes of their data and fed this data into the computer. The student who had written the program then ran the program and presented the output to the class.

It was suggested that the class also use library programs but because there was not an opportunity for the teacher to familiarize herself with these, the suggestion was not carried through.

(7) Several interested students from study hall came in during these periods as well as before and after school to use the computer. Most of this was game playing but one student did work on programming from time to time. Most of his programs were games and chemistry programs.

An attempt to involve the commercial department was made. Conflicts with the commercial classes and lack of opportunity to familiarize the teacher hindered successful operation in this area.

(8) Coastal Carolina, an extension of the University of South Carolina, has used the facilities to teach one of their business and statistics courses both fall and spring semesters. These students were taught how to do basic programming in the Fortran language and write and run certain statistical programs. These classes met in the evening for four days a week. The professor and a lab assistant supervised the computer operation.

B. The computer-oriented Algebra II class will be continued. There will be an attempt to involve all Algebra II classes but not to necessarily involve every student. Provisions have been made for a semester computer math class both semesters. It is hoped the science department will continue and extend its involvement as well as the social studies area. Encouragement to use and introduce the computer will be extended to the other mathematics teachers. Hopefully, more of the mathematics students will have an introduction through introduction in the Algebra I classes. There will be an effort made in the general math classes to involve these students through use of library programs or teacher written programs. More opportunity will be provided to familiarize all students with the machines with certain times made available for open house.

C. Coastal Carolina will no longer use the facilities for their regular and summer program. The school is obtaining its own facilities and will continue similar operation. Use by Coastal Carolina has extended use to approximate 125 college students.

D. Because of the uncertainty of Myrtle Beach High's continuation of the program by local funds, Coastal Carolina organized and set up its own program.

II. PROJECT PERSONNEL

A. Professional Staff

(1) Mrs. Nancy Boyd - teacher and project director

The responsibilities of the director consisted of supervision and coordination of the total program. She was also responsible for teaching of an Algebra II class with computer programming and a class in computer programming.

(Salary - (local funds) $3,739.00)

(2) Mr. James Sealey - part-time teacher

Mr. Sealey relieved the director of two classes in order to provide adequate time for the director to supervise

(Salary - $2,200.00)

B. Consultant Service

(1) Mr. William Hynds, Math Consultant, South Carolina State Department

(2) Mr. E. G. Blakeway - teacher and coordinator for SCSC, Raleigh, North Carolina

(3) Mr. Bob Jones, Math Consultant State Department of Education North Carolina

C. Non-professional Personnel

None

III. Private, Non-profit Schools

There was no involvement

IV. DISSEMINATION

A. The program was open to visitors at all times. Teachers and students from other schools were invited to visit for a demonstration. However, there was little response to any of the invitations.

The only publications were student written reports in the local paper. (Copies are not readily available) and local administrative reports.

B. Since federal funds would be terminated after this year, local civic clubs were contacted to perhaps help in future funding of the program. The director, principal and two key students participated. There were no specific materials distributed. Copies of student programs and related materials were made available for observations.

C. There were approximately ten persons from outside the area who visited the project.

Five persons requested information.

Visits to other school districts within and outside the state and N.C.T.M. Conventionsin Charleston, S. C. and Houston, Texas in April, 1973 resulted in discussion and interchange of ideas and materials Also contact was made with interested persons such as Larry Hatfield, author of CAMP series of computer oriented books in algebra, geometry and general mathematics.

V. PROJECT EVALUATION

A. Process Evaluation

The Blyth Algebra II Test was administered to 12 Algebra II - Computer students in September, 1972. The test was also given to one on the regular Algebra II classes at Myrtle Beach High and to a regular Algebra II class at nearby Socastee High School. In the confusion of interchanging the test materials, the tests were misplaced and could not be found. Discovery of this was not made until late spring and new test materials did not arrive in time to be administered to the Algebra II students.

Each student enrolled in Algebra II and in the Computer Math class, as well as other students, was assigned a number for identification. Each month a report was received which gave an individual breakdown of programs on which the student had worked dates, computer CPU time and actual length of time on line. These reports were useful in determining several factors.

(1) Whether some students were using the computer more than others.

(2) How to make adjustment for individual students and for certain programs.

(3) Whether students were utilizing the computer effectively and wisely.

(4) Types of programs run by the students.

(5) Amount of time used by student to debug his programs

By studying these reports the project director was able to determine whether students were working on programming or running library programs and help eliminate some of the problems created in connection with this as well as other type problems. The students also found the reports interesting and used them to check themselves in excessive use of computer time and on-line time.

Teacher evaluations were given periodically both in the Algebra II class as well as the computer math class. At least one teacher-constructed test was given each marking period to check computer techniques and programming skills.

Written observations were made throughout the year. These will be used for continuation and extension of the program and for references.

Use of the computer by other classes has been difficult to evaluate. Introduction and use in the science and social studies classes generated some interest and a few students returned to observe the operation and work of the Algebra II and Computer Math students but none of them seemed interested enough to pursue the programming. One of the biggest problems was that neither the science teacher nor the sociology teacher could operate or program. Neither had the opportunity to work with the director in learning the use of the computer.

Effort was made by the director to get some of the general math students involved and Algebra I students but lack of cooperation from

the teachers involved in these areas prevented any actual participation. In many instances the director made an offer to go into these classes and introduce use of the machines and the BASIC language but there was much hesitation on the part of the regular teacher to allow this. Excuse was that there was loss of time needed for the regular material content. Attempt to interest a few students in these areas through other students was also made. There was more response from this approach.

It has been observed that one of the most difficult tasks has been getting teachers involved in the program. Teacher-involvement of course means more student-involvement. Workshops have been provided and help offered from both the director and key students. Invitations to visit classes and observe operation of the computer has been extended to the entire faculty. Only a few showed interest. Generally there is a fearful attitude toward the computer and its use in the curriculum. Strong effort will be made to erase this attitude and to have more involvement among the faculty members through education of the students.

Breakdown of communication lines prevented extension of the program to other schools. Invitation was given to the high schools in the county as well as to Georgetown's Winyah High School to visit Myrtle Beach High and see a demonstration. There was no response. Invitation was extended to administrators from other schools and county officials.

Myrtle Beach High was involved in April in a re-evaluation for Southern Association Accreditation. Members of the evaluating team were very impressed with the program and recommended that the program be continued.

Experience over the past three years indicates that the computer should not be limited to certain students. It is true that in general students with stronger backgrounds in math are able to cope more easily with programming. The use of the computer and/or presentation of certain topics in math or science with some of the lower level students can be very effective and rewarding. There appears to be a certain amount of enthusiasm and interest generated through the use of the computer in the low level classes but it must be handled carefully.

The experimentation with activities in the Computer Math Class has been very enlightening. Classes where there is a wide spread of background and ability provides much of a challenge. Some of the activities used had to be abandoned since they were found to be much too difficult for the majority of the class members. Work had to be geared individually and additional work provided for the student who moved at a faster pace and/or who was capable of more complicated programming.

Because each class was different and because each student met the challenge of the computer in a different manner much "Try-it-and-see" type activities were used. If these activities were not successful

or well met by the class, the approach was changed. This caused much frustration on the part of the director but there was also many activities that were very rewarding. There will always be students who will really be "turned on" by the computer as well as those who will really be "turned off". Use of the computer cannot be forced upon any student or teacher. Anyone working with the computer must have successful interaction or he will immediately become very frustrated and in many instances will not continue his work. To meet the challenge of teaching the use of the computer one must face the fact that he must get "involved" and in some instances be left far behind by his students. Working with computer oriented materials and teaching computer techniques is frustrating, exasperating but very rewarding and fulfilling.

B. PRODUCT EVALUATION

1. (a) Objective: To raise the achievement level of students presently enrolled in accelerated geometry, algebra II, algebra III and accelerated senior mathematics and general mathematics III.

Evaluation: The accelerated geometry class was integrated into the regular geometry classes. Students were encouraged to participate in use of the computer, seeking their own instruction in its use and learning the programming. There was little response and no way to evaluate this. The experimental group and control groups of Algebra II students were pre-tested with the Blyth

Second-year Algebra Test. Unfortunately the testing materials were misplaced in the shuffle between Socastee High and Myrtle Beach High. New materials did not arrive in time to post test the students at the end of the year. Lack of cooperation prevented involvement of the general Math III students. The Algebra III students were not given formal instruction but did have assignments. There were assigned library programs that had to be called and run by the student and information turned in. The student could not be evaluated except on the success of each student in executing these assignments. Only a few had difficulty and this was minor. All of the accelerated senior math students had had some introduction to the use of the computer. There were no formal assignments given but at least two did programs and/or worked as student aides. No evaluation could be made. Our note would be that all of the students took the National Math Test on which scores were much higher this year. Experience in programming, it was observed, can be very helpful in improving problem solving skills.

(b) Objective: Improve performances of students in related curricula such as chemistry, physics, biology, etc.

Evaluation: Student-written programs were used in conjunction with both physics and chemistry labs. There were students in both of these classes who had been or were enrolled in the

Algebra II-Computer class. These students supervised and helped the other members in calling and running these programs. Library programs were used especially by the physics class. These were simulation programs such as: DECAY 1 and DECAY 2, LENSES (Solves lens problems) SLITS (Young's Double - Slit experiment). These provided addition and/or review work. All work attempted in these areas was successful.

An experiment conducted with the social studies department was also successful. The sociology class under the guidance of one of the students in the Algebra II - Computer class conducted a poll, organized data, made tapes and fed information into the computer. The program was written and run by the student.

All other attempts to involve other classes outside the math department were unsuccessful.

(c) Objective: Improve student's scores on the National Mathematics Test and/or other tests such as the PSAT.

SCORES 1973	SCORES 1972	SCORES 1971
	-1.00	16.75
13.00	15.50	5.00
7.75	7.50	8.50
12.50	3.50	26.75
12.50	4.75	19.00
6.50	18.75	22.00
11.25	38.00	16.25
14.00	23.25	8.50
18.50	8.25	4.00
22.50	20.75	21.75
30.75	19.75	1.50
		28.00
MEAN - 14.93	MEAN - 14.53	MEAN - 14.83

(d) Written observation made throughout the year are included. There were thirteen Algebra II students and seventeen computer math students. In Algebra II and computer math assignments for programs were made for each six weeks marking period. The number of programs required, varied. For the better programmer ideas and programs could be combined but for the weaker programmer it was suggested that they turn in separate programs. Some programs turned in were group effort. Three members of the Algebra II class dropped at the end of the first semester. Two of these students had learned to program but required help. They had turned in at lease half of the assigned work for first semester. The third student had taken programming during the spring of 1972 and was an excellent programmer. He spent much time in class helping other students but did not turn in his work. He had lost complete interest in the course by the end of the semester.

A fourth student did not drop the course but did very little work. He did work on programming a little during the first two marking periods. He seemed to participate more when the class did group work. His programming skills were very limited and he turned in only about two programs. It was apparent that he did do work on other programs but he did not turn these in. The remaining members of the class fell into three categories. Those that became excellent programmers, average and below average. There were two who fell into the below average group. One boy had difficulty but worked hard and a girl who became frightened at using the machines. She was hesitant to run her programs and would not seek help even after encouraged to do so. The others were able to successfully turn in the majority of the assignments. Copies of successful programs were kept in folders and some of the more interesting programs have been placed in notebooks to be kept for other student to see and study.

Work in the computer math class was handled a little differently. Here more concentration was placed on programming. The students had twelve programs assigned the first marking period. Except for one, all were fairly simple. All members except three turned in their programs. In some cases the students worked together and even though they had turned in individual programs the programs had been joint effort. Several students were not capable of producing a program alone. The second marking period had seven

programs assigned with a few supplementary programs that were optional. Only about half of the class completed all assigned work. Several had worked on the supplementary work and had done no assigned work. One boy did no work. He eventually failed the course because he had not even done a minimum amount by the end of the semester and did not take his exam. The last marking period consisted of group assignments. Each group had six programs and the members were evaluated according to whether each participated in writing and running the programs and used their time wisely. For those who were industrious, additional programs were given for extra credit. This was successful for the majority of the class. There were two students who did not work and two who dropped out of school.

Since the majority of the students in the computer math class were average and below in programming skills the proficiency test was not given. A teacher-made test, though, was given at the beginning and end of the semester. Scores on these ranged according to the student's ability to produce his own programs. Most of the class was able to answer questions about the use and operation of the machines and on fundamental programming and debugging.

2. List schools and/or school districts which have implemented objectives and activities of the project.

Several schools in the Greenville, S. C. area have been teaching the Algebra II with computer programming but it is not known if these schools or others have implemented any of the objectives or other activities.

3. Report the effect of the project on the cooperating agencies by:

(a) Listing all the community agencies that cooperated in the project.

Coastal Carolina, an extension of the University of South Carolina, has utilized the facilities to teach one of its business courses for four summer sessions and four regular terms.

(b) Discussing the result of such cooperation

Coastal had no access to computer facilities and since the course was a requirement in their business program, the possibility was discussed to use Myrtle Beach's facilities for a night course. This procedure has worked very well. Arrangements were worked out as to use of materials such as paper, paper tapes, etc. Coastal leased another teletype model 33 and placed this in with the other machines so that the high school students would have access to it. Over the two year period the college classes have held approximately 150 students. The language taught was Fortran and the course included the study of statistical programs

needed in business areas.

4. Summarize the influence of the project on:

(a) other Federal and State Programs.

None that is known

(b) Public support for education innovation and change.

There is a positive and open attitude by the public in general but difficulty lies in producing monetary support. Communication is poor between administration and the classroom and there has been few supportive efforts made to extend the program beyond Myrtle Beach High.

(c) Educational programs in urban ghettos

None

(d) Educational programs in isolated rural areas

None

(e) Educational programs for pre-school children.

None

(f) Educational programs for the handicapped

None

(g) Educational programs for minority groups

None

EVALUATION QUESTIONNAIRE

1. How was the computer used as an instructional tool? (Was a specific topic introduced with the computer? Did the use of the computer foster the further investigation of a topic, etc.?)

There were several areas in Algebra II in which the computer was used principally to introduce new material or to reinforce presentation. As example of this would be finding points of discontinuity for functions or approximation of irrational roots.

In computer math the computer was used to find evaluation for graphing, to review signed numbers for examples. Questions arose with individuals as they attempted to debug programs and run them. One of these applied to scientific notation and computer output; another to division by zero. These were topics of class discussion.

Several students who pursued the computer alone or who worked on supplementary work were led into investigative work through ideas presented in class. Several game programs were written after discussions on probability, for example.

2. What areas of the curriculum seemed best suited for computer work?

Science and mathematics. Students enrolled in the upper level courses are capable of more complicated programs but the lower level students can write simple programs and run stored programs.

However, use of the computer should definitely not be limited to math and science. It can be used very effectively in the curriculum areas as well.

3. Were students able to operate the teletype in terms of putting programs in and getting results out?

Yes. There seemed to be little problem here even with the lower level students. Someone was needed, however, to supervise and answer questions while the lower level students were on line. The project director or a student was usually available for this.

4. Were students able to write workable programs?

Yes. The Algebra II students were successful and the majority of the computer math students. However, a few in computer math could not write their programs completely alone. Files are available with student-written programs. These range from very simple to fairly complicated and are on all topics of math and science.

5. Did the use of the computer clarify the mathematics invloved for any students?

To be able to program a problem a student must understand the mathematical algorithm as well as all logical possibilities involved in the problem. Students who had difficulty with writing programs had difficulty with the logic involved in problem-solving and did not spend necessary time and effort needed to develop better problem solving techniques.

6. Was the computer used as an extracurricular activity?

The Math Club attempted programs but lack of student leadership caused a drain of interest.

7. What by-products in terms of learning did you observe related to the experiment?

One student in the Algebra II class is pursuing independent study work this summer in metrices and probability. She is using the computer to debug programs she is to write in these areas.

There were a few students who attempted Fortran, another programming language. There was no formal instruction in this area. However, manuals, programs and reference books were made availble to any student who wished to pursue the study of other languages.

It was found that the lower level student was fascinated with the use of the computer. Stored programs were used to review certain mathematical topics for these students. Also they learned to write simple programs. Some made attempts to write programs using the ideas covered in class and were successful with outside assistance.

8. What attempts, if any, were made to extend the experiment to other schools, other staff members, other pupils? (Describe what was done, the difficulties involved and what was accomplished.)

Several invitations were extended to the schools in the county, but there was no response. Visits were made by coordinators and principals

from several school systems outside the county. It was hoped there would be some response. There was none.

The project director tried on several occasions to involve teachers from other curriculum areas. One of the social studies classes did use the computer to compile and analyze data but further involvement was unsuccessful. Attempts to involve other math classes and science classes other than Chemistry and Physics were fruitless. Student attempt to involve students outside of the program classes was more successful. Students involved in the computer class would, for example, bring friends in to show them what they were doing. This in turn got these students involved

Stuients who were interested were given instruction and in many instances a good programmer was assigned to help them.

Coastal Carolina has continued its use of the facilities. A business course in statistics and computer programming was taught during the summer and fall of 1972 and spring of 1973. An estimated 100 students were involved.

9. What outside resources, if any, were utilized to enrich the experiment?

Several accounting and banking firms in Myrtle Beach have computers. These were visited by the students. This is an asset to the student's understanding and broad concept of that which a computer really consists.

10. What administrative problem affected the use of the equipment?

The classroom and computer rooms are very small. There are problems with noise, lighting, ventilation and space.

More encouragement and support should come from administrative levels with involvement of students and teachers.

11. Was the inservice training for the staff carried on during the summer of value? (In what ways could such an endeavor have been more profitable?)

There was no formal inservice training to the staff since all members had participated in the summer of 1970.

12. What mechanical difficulties were encountered with the system? (Indicate those that seriously affected the usefulness of the computer as a teaching tool.)

Few difficulties were encountered with communication lines. The computer itself was down on several occasions and presented problems especially with assignment dates.

Repairs for the teletypes has been difficult to obtain since a repairman must come from Raleigh, N. C. There was usually a delay and congestion problems developed with student use of the remaining machines. Myrtle Beach does not have a firm that offers rental and repair of such machines.

STUDENT REPORT

As a student who is highly interested in computer work, I am constantly searching for new applications of our unit here. Mrs. Boyd, the Project Director here, has asked me to look for any means whereby we might stimulate interest in the Project, and/or bring computer usage to a larger section of students.

The audio-visual aids department of Myrtle Beach High School library has acquired a camera-video-tape recorder-monitor unit this year. After some thought about a use for this, I hit upon an idea.

The size of our "Computer Room" - the cubicle housing our TT-33 unit - is approximately 9' X 15", too small to accomodate a large class. Also, only one person can sit at the teletype keyboard and perhaps 4-6 can stand behind him to see the work. This creates confusion, lack of interest, and loss of learning by those who are unable to see the print-out.

Introduce the VTR unit and the problem is greatly alleviated. The procedure is simple. Focus the camera on the teletype print-out and record, call an instructional or laboratory type program from the local or general library, run it, and record it simultaneously.

Next we bring the VTR and monitor to the classroom and play back the program. There are several methods of using one program: laboratory exercise, demonstration, etc. If a LIST copy is used in conjunction with a recording of the run, program analysis can be greatly facilitated. The possibilities are only as limited as the computer.

I recorded a Huntington project program dealing with Coulomb's law and played it back for my physics class. Interest in the program and the teletype unit was bolstered by my unique application of it: through a TV. The students thoroughly enjoyed it, mainly because it was new. Even as newness wanes, practicality becomes more apparent to the student, who dislikes "that cramped computer room".

In summation, the VIR unit embraces interest in the computer, and so a larger number of our students are able to make use of it.

Respectfully submitted,

Peter Harvin

COMPUTER BREAKDOWN REPORT

MONTH	*USERS	ON-LINE TIME	CPU TIME
September	53	57.42 hours	7896 secs
October	75	102.03 hours	9914 secs
November	69	95.35 hours	10468 secs
December	No report		
Janaury	105	122.75 hours	14320 secs
February	96	93.49 hours	8141 secs
March	91	135.49 hours	17884 secs
April	65	86.96 hours	8523 secs
May	55	79.90 hours	11408 secs

*This is estimated and in some cases does not include students from Coastal Carolina.